Uses and Gratifications of Initiating Use of Gamified Learning Platforms

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Abstract
Research on gamified educational platforms has chiefly focused on game elements motivating *continued engagement*, neglecting whether and why people choose to use them in the first place. Grounded in Uses & Gratifications Theory, this study therefore combined use diaries with follow-up interviews to explore the situated reasons for use of 83 students who voluntarily used a gamified online learning platform. Partial data analysis suggested a *motivational threshold* of gamification: game design elements don't motivate the initiation of new use sessions per se, but are able to prolong an already started session. Some other pre-existing sought uses and gratifications are required for gamification to work, although gamification may *indirectly* support these. Main reasons for initiating use of a gamified learning platform were learning, curiosity, fun, need for closure, and competence.

Author Keywords
Gamification; Education; Uses & Gratifications Theory; Reasons for use.

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Introduction

In recent years, the use of game design elements or *gamification* [4] has seen a boom in education [10]. Research in the area has primarily focused on performance-related outcomes, finding mixed results [5]. Notably, the majority of existing work has probed whether gamification leads to *continued* engagement with a system or content, given captive lab or classroom audiences. Less is known about whether, how, and why learners choose to use a gamified learning platform at a certain moment in time [10].

Both in HCI and media research, Uses and Gratifications (U&G) [7,11] is the go-to theoretical paradigm to frame and explain people's situational selection of media and interactive technologies [8,12,13,15]. According to U&G, media consumption "is largely goal directed and purposive" [12:167]. Given their own current state and current environment, people encounter situational problems in satisfying basic human needs and actively choose to use a medium or technology if it promises the best currently available solution to that problem. This situated expected U&G shape the medium's or technology's effects [13], and the extent to which they then gratify the user's needs will impact the amount of time spent with them and future use intention [15].

One notable study that has explored people's reasons for using gamified services is Hamari and Koivisto [6] showing that utilitarian (e.g., ease of use) and hedonic (e.g., enjoyment) aspects lead to a higher continued use intention in a gamified fitness app. However, these findings are based on a questionnaire study of existing users of a given app, asking for general reasons for use with pre-existing, abstract constructs and questionnaire items like "usefulness". Not only is the generalization of these findings to education questionable, its study design is ill-suited to uncover people's actual situational uses and gratifications sought.

In response, we conducted a qualitative, bottom-up, *in-the-wild* study, led by the following research question: *What are learners' situated uses and gratifications sought for using a gamified learning platform?*

Method

Specifically, we combined a diary study method [1] to capture actually occurring use initiations with follow-up face-to-face interviews with diary study participants to unpack underlying perceptions and needs of the captured incidents.

We selected two popular online learning platforms, Khan Academy and Codecademy[1], which are considered as typical contemporary gamified platforms, incorporating game elements like badges, points and – on Khan Academy - avatars [4]. We selected the introductory HTML & CSS-course on both platforms as a case study because (1) the comparability due to their similar content; (2) the lack of prior knowledge needed to follow the course; and (3) they were free to use[2].

To guard ecological validity, inclusion criteria for participants were defined as them having no programming knowledge, but vocalizing an interest in joining an online course for learning how to code. We recruited among Flemish university students; the incentive was a 1/5 chance to win a € 10 voucher of a Belgian multimedia chain. Interested students registered by filling out an online registration form. After data cleaning (see Table 1), the final sample consisted of 83 participants (32 female; age:

Exclusion criteria	***n***
Prematurely quitting the study	8
Not filling out the diary	1
Not using the platform	1
Not following the HTML-course	3

Table 1: Overview of exclusion criteria and the number of participants excluded from the initial sample (N = 96).

[1] See www.khanacademy.org and www.codecademy.com

[2] Shortly after the end of this study, Codecademy introduced paid pro-futures.

Overview of diary and interview questions

Relevant diary questions

- What was the reason you decided to use [*name of platform*] just now?
- Describe in as much detail as possible what you did and what was going through your mind when using [*name of platform*].
- Do you have any remarks regarding this experience with [*name of platform*]?

Examples of relevant interview questions

- What's your general impression of the website?
- Imagine that you can brief the developer of the website about a new version of this website. What would you like to tell them? [*probe: positive & negative elements of the website*]
- In your diary, you have mentioned that you started using the website because [*reason mentioned in diary*]. Can you elaborate on this?

M =20.82; *SD* = 1.30). Participants who never used Khan Academy and Codecademy before (*n* = 75) were randomly assigned to one of the platforms, whereas participants who used one of the platforms before to engage with other learning content (*n* = 8), were automatically assigned to the platform they didn't previously use. In the sample, there were no participants with experience on both platforms. This distribution technique led to 44 participants using Khan Academy and 39 Codecademy.

Participants were thoroughly briefed and gave informed consent. The university's Ethical Committee approved the procedure of this study. During two weeks, participants were asked to follow the HTML-course on the gamified learning system whenever they felt like it, as often as they liked. They were to fill out a digital diary each time they interacted with the website, including an open-ended question gauging the participant's reasons for use (see side bar). Answers of the same participants were linked over time by asking initials and birthday. The study yielded a total of 173 diary-entries for Khan Academy and 158 diary-entries for Codecademy. After the two week-diary study, diary entries were used as prompts in semi-structured interviews for participants to elaborate on their situated reasons for use (see side bar). At the end of the interview, each participant got the opportunity to share additional thoughts and remarks they deemed relevant. Interviews lasted around 30 minutes.

Interviews were transcribed *ad verbum* and coded alongside the diary entries using the qualitative data analysis software MAXQDA12. Data analysis was guided by the coding procedure proposed by Corbin and Strauss [3], successively progressing through open, axial and selective coding. Research-specific reasons for use (e.g. "to help the researcher out") were omitted from analysis. As the data analysis showed that users' experiences for both websites were very similar, both platforms will be discussed simultaneously in the remainder of this paper.

Results

Partial data analysis of the diary and interview data revealed five reasons for using the gamified learning platform. These are, in order of popularity: (1) learning, (2) curiosity, (3) fun, (4) need for closure, and (5) competence.

Gamification itself was identified as a reason for use by one single participant out of 83 (P80; see Table 2). She described a strong urge to unlock new badges and avatars. After finishing the HTML-course, she even started completing exercises in subjects she already mastered to progress in her spree. This continued until she collected all unlockable avatars.

> Interviewer: *"Would you recommend the developers to create new avatars?"*
> P80: *"Absolutely! That would motivate me even more to continue learning other things [on the platform]. […] If there would be more avatars, I would feel inclined to also follow the [courses] I don't know what to expect from."*

All other participants pointed to other main situated reasons for use. However, gamification was mentioned several times as being conducive to these reasons (though not necessary nor the sole or main cause). For example, having *fun* was mentioned by 24 participants as a reason for using the platform, with game elements significantly contributing to it. P1 described starting a new session because she enjoyed the previous two sessions that much. P65 added that badges made fun gratification more salient:

P	Gender	Platform
P1	female	Codecademy
P2	male	Khan Academy
P11	male	Codecademy
P31	male	Khan Academy
P32	female	Khan Academy
P40	male	Khan Academy
P65	male	Codecademy
P80	female	Khan Academy
P82	female	Codecademy

Table 2: Overview of quoted participants, their gender and platform used.

The badges distance [the platform] from a kind of course you would be taught in school, but rather, they made it resemble like a game, or some leisure activity you can do. (P65)

However, participants explained that they would still use the platform if game elements were to be removed.

> *[The game elements] motivated me. I thought they were great. But it's not like I would only [use the platform] because of them, although it is a nice added value.* (P2)

Game elements also contributed to the *need for closure*. Students (n = 22) explained using the platform because they felt they needed to finish a certain exercise or chapter. For example, P31 described that he decided to use the website because he still had to complete the last exercise of the chapter 'More HTML tags'. Here, game elements like badges would serve as intermediate goals. Badges provided a natural ending, motivating several learners to prolong a session until they reached this point. In other words, receiving a badge was a specific way to achieve closure.

> *I felt that, like, [receiving a badge] indicated that you had finished a big part and that really served as a nice ending.* (P82)

However, in the majority of cases, reasons for initiating use didn't relate to gamification. *Learning* (n = 69) and *curiosity* (n = 34) were the most popular reasons for initiating use. Students using the website for learning showed a genuine interest in HTML, envisioning to develop coding skills. Deeper reasons for wanting to learn to code varied from wanting to create a personal website to considering it as a valuable skill for the future.

> Diary: *"What was the reason you decided to use Codecademy just now?"*
>
> P11: *"I want to expand my knowledge of HTML so I can start building my own webpage soon."*

When participants indicated they started a new session out of *curiosity*, they mainly wanted to explore the platform or check how the learning content would evolve. For example, P40 voiced that after using the website a couple of times, he "got curious" about the remainder, "want[ing] to know how it works."

Lastly, some participants (n = 10) indicated to use the website just because they enjoyed being good at it (*competence*). Competence satisfaction strongly motivated students to start new sessions, only to experience the same feeling over and over again.

> *You are expanding your abilities more and more, and, yeah, this might sound silly, but you feel proud. Like 'ah nice, I can do this and I can do that'. So, you start to feel a sort of urge to further expand your abilities.* (P32)

Discussion

This study showed that game design elements aren't the perceived main reasons for initiating situational use of a gamified learning platform. For some, game design elements were *indirectly* conducive to other U&G sought (namely, fun and need for closure). Once users did engage with a platform, game design elements did, however, partake in motivating continuing an ongoing session. Put differently, gamification didn't directly motivate people to initiate using a platform, but instead provided 'stickiness' once a session had started. We call this gamification's *motivational threshold*: people need to already seek initial expected non-gamification U&G to start using a gamified service for game design elements to have some sort of effect. We found five such prominent situated reasons for initiating use: learning,

curiosity, fun, need for closure, and competence. Fun, curiosity, and competence broadly fit Hamari and Koivisto's observation that hedonic aspects have a strong link with future use intention of gamified systems [6], while learning fits their utilitarian category. What our study adds here is replication and specification of their findings for learning contexts, and evidence that both hedonic and utilitarian reasons drive *actual* use, not just correlate with use *intention*.

Also, unlike Hamari and Koivisto [6], we did not find any social motivators like recognition and social influence, which might be due to the lack of foregrounded social interaction features on both Khan Academy and Codecademy. This cautions against generalizing findings from any one particular gamified system or use context, and warrants more research.

Need for closure is an interesting emergent situational reason for initiating use that connects to motivational research on the "Zeigarnik effect": people show more reengagement behavior with a task if it is uncompleted rather than completed [11]. Game designers have pointed to this effect as an explanation for the motivational pull of design elements like collections or quest logs [2,9], but to our knowledge there has been no empirical evidence for its existence in the wild.

These initial results will guide next steps in our work. We here highlight three perspectives for deeper analysis. Firstly, we'd like to develop a more thorough theoretical relating of our categories: *learning* and *competence* for example are both linked to gaining new skills. As part of this, we want to better understand and disentangle *attributes* of the platform (badges), *consequences* of these attributes (incomplete goals), and *values* or *needs* these relate to (closure), as e.g. modelled in laddering studies following means-end theory [14]. Second, we want to extend analysis from session initiation to continuation. Lastly, U&G suggests that external situational factors have a strong impact on perceived problems and thus, usage. Indeed, unreported parts of our data suggest that factors like time or technical access interacted with users' reasons for use. Further data analysis should help us build a more thorough grounded theory of these dynamics around external factors.

In terms of limitations, our study expressly did not inquire people's *initial* choice of a gamified over a non-gamified platform in the wild, nor of a particular platform over another. Our study was also limited by the game elements incorporated in the studied platforms; future work should therefore test whether other features (such as social game elements) would bring out other U&G. Furthermore, longitudinal research is needed to unpack the potential evolution of U&G over time. For example, *curiosity* was found to be the second most important reason for use among our novice participants, but might be less of a factor for more experienced users. The impact of study participation on reported reasons for use is also unclear. This might have led to e.g. overestimating the prevalence of social desirable U&G, like learning. Lastly, in the learning domain, the link between users' reasons for use and learning outcomes is an interesting open question.

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